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Report 13

DISEASE, INSECT, AND ANIMAL DAMAGE SURVEY OF YELLOW POPLAR
TREE EVALUATION PLANTATIONS, WAYNE-HOOSIER NATIONAL FOREST, 1977

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INTRODUCTION

The Eastern Region of the Forest Service is conducting tree improvement programs as a means of bettering the quality and growth rate of hardwoods on the National Forests. An important part of this program is the establishment of tree evaluation plantations. Wayne-Hoosier National Forest yellow poplar plantations were established for the purpose of evaluating genetic-environmental interaction in these areas. Data was needed by Region 9 on biotic and abiotic factors affecting the trees.

This is the third in a series of four reports on evaluation plantations. The first and second reports were on black cherry and yellow birch. The fourth will be on black walnut.

OBJECTIVE

This survey was made to determine the incidence of diseases, insects, and animal damage in yellow poplar progeny test areas on the Wayne-Hoosier National Forest.

METHODS

In June, 1977, we surveyed every planting site in each of six yellow poplar plantations on the Wayne-Hoosier National Forest (four in Indiana and two in Ohio) to determine the incidence of damage in these progeny test areas. Each plantation was examined to determine the diseases, insects, and animal damage present on the seedlings. Examples of the more important conditions were photographed for this report. Questionable samples (e.g., certain cankered limbs or insect feeding symptoms) were collected for laboratory identification.

RESULTS AND DISCUSSION

With the exception of the 1973 Maumee planting in Indiana, over 80 percent of the trees were present in each plantation. At the 1973 Maumee planting, 48 percent of planted trees were dead or missing. This mortality occurred in years past and the cause could not be determined.

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In four of the six plantations, trees are surviving reasonably well. However, at Maumee (Indiana) serious damage has been done by an unknown feeding insect. In Ohio, trees show signs of widespread dieback. The Penn Central tract in particular is in very poor condition because of widespread canker, insect and frost damage. Tables 1 and 2 show numbers of trees present in each plantation and percent affected by specific diseases, insects and animals.

Table 1--Number of planting sites examined, number of trees present, and percent missing by plantation - yellow poplar tree evaluation plantations on Wayne-Hoosier National Forest, 1977

| Plantation name | INDIANA | | | | OHIO | |
|-------------------|---------|--------|--------|------|--------------|----------------|
| | Hemlock | Cliffs | Maumee | | Penn Central | Covered Bridge |
| Year of Planting | 1973 | 1974 | 1973 | 1974 | 1974 | 1975 |
| No.Sites Examined | 434 | 228 | 600 | 214 | 297 | 248 |
| No. with trees | 422 | 210 | 314 | 175 | 292 | 231 |
| Percent missing | 3 | 8 | 48 | 19 | 2 | 7 |

Table 2--Percent trees affected by damage agents on yellow poplar progeny test areas, Wayne-Hoosier National Forest, 1977

| Damage | INDIANA | | | | OHIO | |
|----------------------|---------|--------|--------|------|--------------|----------------|
| | Hemlock | Cliffs | Maumee | | Penn Central | Covered Bridge |
| | 1973 | 1974 | 1973 | 1974 | 1974 | 1975 |
| Cytospora canker | - | - | - | 1 | - | 1 |
| Dieback | 34 | 72 | 28 | 34 | 54 | 49 |
| Frost | - | - | - | - | 52 | 4 |
| Fusarium canker | - | - | - | - | 36 | - |
| Mechanical damage | 20 | 9 | 4 | 3 | 6 | 10 |
| Ambrosia beetles | - | - | - | - | 36 | - |
| Defoliating insects | 79 | 71 | 42 | 23 | - | 1 |
| Leafrollers | 29 | 27 | 2 | 1 | - | - |
| Bud feeder | 1 | 9 | 53 | 52 | - | 1 |
| Tree cricket | - | - | - | - | 38 | 1 |
| Treehopper | - | 1 | - | - | 1 | 3 |
| Tulip gall fly | 66 | 100 | 43 | 21 | 3 | 1 |
| Tuliptree scale | 1 | 2 | - | - | - | - |
| Yellow poplar aphid | 10 | 21 | 6 | 5 | 3 | 19 |
| Yellow poplar weevil | 27 | 18 | 55 | 30 | 0 | 1 |
| Animal damage | 3 | 1 | 2 | 4 | - | 80 |

DISCUSSION

1. Diseases

A. Cytospora canker

Cytospora canker, caused by Cytospora leucostoma var. magnoliae DiSacc., was only found on one percent of the trees in the two areas. The cankers appear as sunken areas in the bark on one-year-old shoots. Pimple-like structures are found throughout the sunken area. The fungus is a weak pathogen and is not causing enough damage to be considered a problem.

B. Dieback (Figure 1)

A shoot dieback of 1 to 4 inches was common in most of the plantations examined. The dieback appeared to have been caused by abiotic factors such as frost and temperature extremes. The dieback appears to be more severe on smaller trees. Most of the dieback on the Penn Central tract was caused by the tree cricket-Cytospora canker complex.

C. Frost (Figure 2)

Frost damage was only a problem in the Penn Central tract. About half of the trees had put out leaves this spring and had died back about 1-4 inches but normally the closest lateral bud developed a shoot.

D. Fusarium canker (Figure 3)

Fusarium canker, caused by Fusarium soloni (Mart) App. & Wr. em. Snyd. & Hans., was found only in the Penn Central tract where it was doing substantial damage. About 25 percent of the trees had died back to the ground from the disease and had resprouted at the root collar. In this stand, the canker was being spread by ambrosia beetles. The cankers first appeared as dead areas around the beetle attacks. Later the cankers spread from the point of infection and killed the tree back to the ground line. The typical sunken cankers and callus tissue did not form because the trees died before either could take place. The canker probably would not have caused the damage if the beetle had not been present.

F. Mechanical damage

Mechanical damage was common in all plantings with the heaviest (20 percent) at the 1973 Hemlock Cliffs planting. This damage can occur during lifting, transporting, planting, and cultivating, or it can be caused by climatic factors such as snow, ice, hail, etc.

2. Insects

A. Ambrosia beetles (Figure 4)

Ambrosia beetles were only found at the Penn Central tract where 36 percent of the trees were infested. Two species later identified as Xyleborus sayi (Hopkins) and Xylosandrus aermanus (Blanford) were extracted from diseased stems. As indicated earlier, these beetles are serious vectors of Fusarium wilt in this study area.

B. Defoliating insects

General defoliators affected most trees in Indiana and almost none in Ohio. Damage was very minor and effect was almost inconsequential.

C. Leafrollers

These caterpillars (possibly Sparganothisspp.) were noted throughout the Indiana plantations. As the name indicates, damage consists of foliage being rolled and consumed from within. Impact was minor with rarely more than one leaf affected on a given attacked tree.

D. Bud feeder (Figure 5)

An unknown tip feeding insect, possibly a Hemipteran, 'was causing substantial damage in the Maumee plantation in Indiana. Buds were usually girdled about the base before budbreak. This causes substantial growth loss, and in some cases, loss of apical dominance.

E. Tree crickets (Figure 6)

About 40 percent of the trees in the Penn Central tract showed tree cricket oviposition scars. The specific insect may have been the snowy tree cricket, Oecanthus fultoni, T. J. Walker. Damage consists of a series of 10-15 holes in a 1-inch row in smaller diameter twigs. In many cases, twigs had died back to the scars because of fungi introduced through breaks in the bark.

F. Treehoppers

Treehopper oviposition damage appears as small sunken areas (usually in a row) which resemble a series of miniature cankers. We have shown that treehopper damage leads to F. soloni infection in yellow poplar; but very few trees in either Indiana or Ohio showed the damage.

G. Tulipgall fly

This midge, Thecodiplosis liriodendri (O.S.), causes a 1/8-1/4 inch yellow-brown foliar discoloration which strongly resembles leaf spot fungus. Incidence was very common (but inconsequential) in Indiana.

1/ Personal communication with Dr. D. E. Donley, NEFES, Delaware, Ohio.

- H. Tuliptree scale (Figure 7)
- i The tuliptree scale, Toumeyella liriodendri (Gmelin), is sometimes one of the most serious pests of yellow poplar. Nevertheless, only a few trees in the Hemlock Cliffs, Indiana, plantation were infested. For the moment, the scale appears to pose no serious threat to the plantation.
- I. - Yellow poplar aphid
- Some trees in all areas were affected by the yellow poplar aphid, Macrosiphum liriodendri (Monell). Leaves attacked by aphids are distorted because of moisture loss. Although widespread, damage to individual trees was minor and insignificant.
- J. Yellow poplar weevil
- Another sometimes serious pest of yellow poplar is the yellow poplar weevil, Odontopus calceatus Say. Incidence of this weevil was high in Indiana but damage was light. Most damage was in the form of larval mining along the leaf midrib as opposed to adult feeding on the undersurface of leaves. Populations appear to be low and should be of no serious concern.
3. Animal Damage
- Rodent feeding was minor in all plantations except in the Covered Bridge plantation where 80 percent of trees were damaged by rabbits. The damage varied from small shoots clipped off to girdling at a height of six inches or more.

ACKNOWLEDGEMENTS

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Figure 1. Dieback on yellow poplar caused by abiotic factors



Figure 2. Yellow poplar leaves damaged by frost



Figure 3. Canker on yellow poplar caused by Fusarium soloni



Figure 4. Yellow poplar stem with ambrosia entrance hole



Figure 5. Bud on yellow poplar showing damage caused by Hemipteran

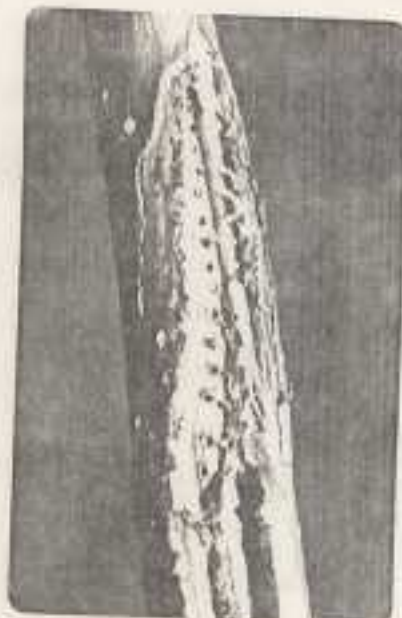


Figure 6. Damage caused by tree cricket on yellow poplar



Figure 7. Tuliptree scales on yellow poplar